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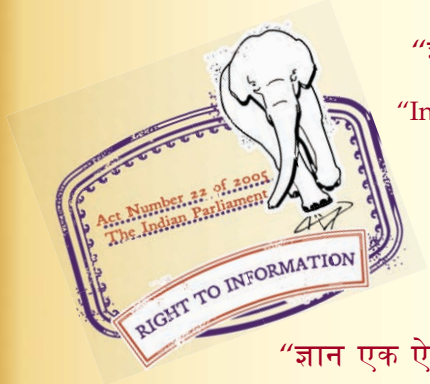

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IS : 40 - 1971
(Superseding IS : 41-1950, IS : 42-1950 and IS : 43-1950)
(Reaffirmed 1997)
Edition 2.1
(1987-09)

Indian Standard

SPECIFICATION FOR CARBON BLACK FOR PAINTS

(First Revision)

(Incorporating Amendment No. 1)

UDC 661.666.4 : 667.622.14

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Price Group 3

IS : 40 - 1971
(Superseding IS : 41-1950, IS : 42-1950 and IS : 43-1950)

Indian Standard

SPECIFICATION FOR CARBON BLACK FOR PAINTS

(First Revision)

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Indian Standard

SPECIFICATION FOR CARBON BLACK FOR PAINTS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 24 December 1971, after the draft finalized by the Raw Materials for Paint Industry Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard was first issued in 1950 based largely on the interim co-ordinated draft produced with the assistance of the representatives of manufacturers and of various departments and authorities of the Government of India by the Co-ordinating Subcommittee of No. 5 Standing Committee on Specification for Paints and Allied Stores of General Headquarters (now Army Headquarters).

0.3 The difficulties faced by the paint industry in getting supplies of correct quality material resulted in the review of the original standard. Such a review revealed that a revision of IS : 40-1950*, accommodating various types of the material like jet black for general purposes and having clean blue undertone will meet the requirements of the paint industry.

0.3.1 In this revision the classification of the material is based on the method of production, namely, furnace blacks, channel black, etc. In this revision new requirements for colour value by Nigrometer, *p*H, moisture and fixed carbon have also been included.

0.4 This revision supersedes IS : 41-1950† and IS : 42-1950‡ and IS : 43-1950§ and recommends the use of carbon black conforming to this standard in paint formulations in place of bone, vegetable and lamp blacks which are neither produced in the country nor consumed by the paint industry.

0.5 This edition 2.1 incorporates Amendment No. 1 (September 1987). Side bar indicates modification of the text as the result of incorporation of the amendment.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960||. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Specification for carbon black for paints.

†Specification for bone black for paints.

‡Specification for vegetable black for paints.

§Specification for lamp black for paints.

||Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard (First Revision) prescribes requirements and methods of sampling and test for carbon black for paints.

2. TERMINOLOGY

2.1 For the purpose of this standard definitions given in **2** of IS : 33-1963* and in IS : 1303-1963† shall apply.

3. CLASSES AND TYPES

3.1 The material shall have the following classes:

Class 1 — Channel black, and

Class 2 — Furnace black.

3.1.1 The channel black shall have jet black undertone.

3.2 The furnace black shall have two types:

Type 1 — For general purposes; and

Type 2 — For tinting purposes having a clean blue undertone.

4. REQUIREMENTS

4.1 Form and Condition — The material shall be supplied in the form of dry powder or in such a condition that it can be reduced to the powder form by crushing, without grinding action, under a palette knife.

4.2 The material shall also comply with the requirements given in Table 1.

5. PACKING AND MARKING

5.1 Packing — The material shall be packed in polyethylene bags which in turn shall be packed in three-ply paper bags or in containers as agreed to between the purchaser and the supplier.

5.2 Marking — The containers shall be marked with the following:

a) The name of the material;

b) Manufacturer's name, and trade-mark, if any;

c) Date of manufacture;

d) Mass of material; and

e) Batch number or lot number in code or otherwise.

5.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

*Methods of test for dry pigments and extenders for paints (*revised*).

†Glossary of terms relating to paints (*revised*).

TABLE 1 REQUIREMENTS FOR CARBON BLACK FOR PAINTS

(*Clause* 4.2)

Sl No.	Characteristic	Requirements		Methods of Test, Ref to	
		Class 1	Class 2	Appendix	Cl No. in IS : 33-1963*
(1)	(2)	(3)	(4)	(5)	(6)
i)	Volatile matter, percent by mass, *Max*	15	3	—	6
ii)	Moisture, percent by mass, *Max*	1	1	A	—
iii)	Residue on sieve, percent by mass, *Max*	0.05	0.05	—	7
iv)	Oil absorption	275 to 375†	Within ± 10 percent of approved sample	—	8
v)	Colour (blackness), nigrometer index	55 to 65	85 to 95	B	—
vi)	Tone	Not inferior to the approved sample		—	10
vii)	Matter soluble in water, percent by mass, *Max*	0.25	0.25	—	12
viii)	Fixed carbon, percent by mass, *Min*	85	97	—	(By difference of 100-volatile matter)
ix)	*p*H value, *Max*	4	5 to 9	—	14
x)	Acetone extract, percent by mass, *Max*	0.02	0.5	—	16
xi)	Ash, percent by mass, *Max*	0.02	0.5	—	17

*Methods of test for dry pigments and extenders for paints (*revised*). (Since revised).

†It shall be, however, within ± 10 percent of the sample approved against this specification, if any.

6. SAMPLING

6.1 The representative samples of the material shall be drawn as prescribed under **3** of IS : 33-1963*.

7. TEST METHODS

7.1 Tests shall be conducted as prescribed in IS : 33-1963* and in Appendices A and B. References to relevant clauses of IS : 33-1963* and Appendices A and B are given in col 6 and 5 respectively of Table 1.

7.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960†) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

8. CRITERIA FOR CONFORMITY

8.1 A lot shall be declared as conforming to the requirements of this standard if the test results of composite sample satisfy the requirements prescribed under **4**.

APPENDIX A

[*Table* 1, *Item* (ii)]

DETERMINATION OF MOISTURE

A-0. GENERAL

A-0.1 Outline of the Method — The material is heated under reflux with an organic solvent which is immiscible with water. The carrier liquid distils into a graduated receiver carrying with it water which then separates to form the lower layer, the excess carrier liquid overflowing from the trap and returning to the still.

A-1. APPARATUS

A-1.0 The Dean and Stark apparatus used for determination of water content has the following essential features.

A-1.1 Flask — of 500 ml capacity, as shown in Fig. 1, and made of hard resistance glass, well annealed and as free as possible from striae and similar defects. Alternatively, a metal flask may be used.

*Methods of test for dry pigments and extenders for paints (*revised*). (Since revised).

†Specification for water, distilled quality (*revised*).

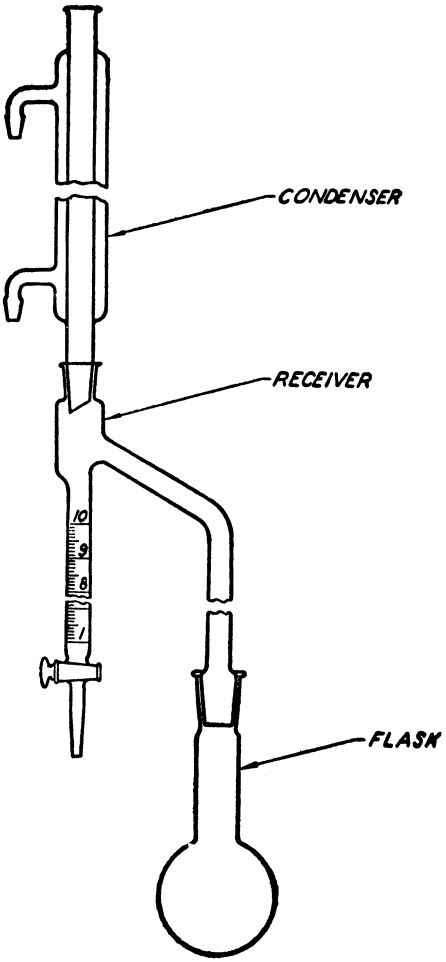

FIG. 1 DEAN AND STARK ASSEMBLY (WITH 10-ml RECEIVER)

A-1.2 Condenser — made of hard resistance glass, well annealed and as free as possible from striae and similar defects, with shape and dimensions as shown in Fig. 2.

A-1.3 Spray Tube — made of glass, sealed at one end, having four small holes equidistantly placed around the wall near the closed end of the tube, with the shape and dimensions as shown in Fig. 2.

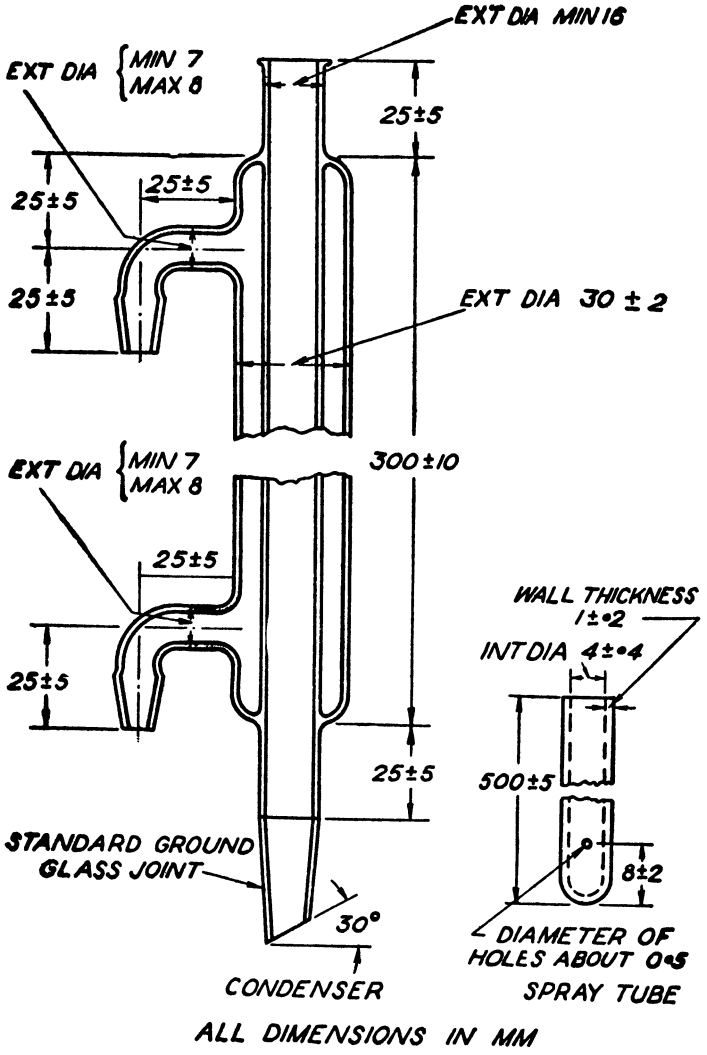

FIG. 2 CONDENSER AND SPRAY TUBE (DEAN AND STARK APPARATUS)

A-1.4 Two-Millilitre Receiver — made of hard resistance glass, well annealed and as free as possible from striae and similar defects, provided with ground glass joints, and of shape and dimensions given in Fig. 3. It consists essentially of the upper chamber together with the tube and ground joint leading to the flask and the graduated tube. When a metal flask is used, care shall be taken to provide an air-tight connection between the flask and the receiver. The graduated portion shall have a capacity of 2 ml at 20°C when filled to the highest graduation mark. The scale shall cover the range of 0.1 to 2 ml and shall be divided into intervals of 0.05 ml. The graduation marks corresponding to 0.5, 1.0, 1.5 and 2.0 ml shall be numbered. The numbered graduation marks shall be carried completely round the tube. The graduation marks corresponding to 0.15, 0.25, 0.35 ml and so on up to and including 1.95 ml, shall be carried halfway round the tube. The remaining graduation marks shall be intermediate in length and shall

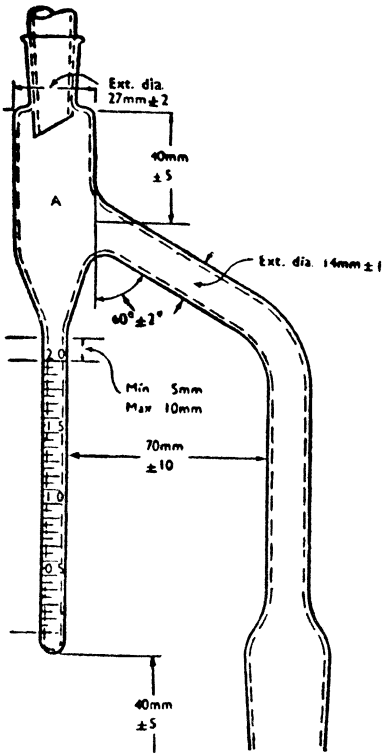

FIG. 3 2-ml RECEIVER (DEAN AND STARK APPARATUS)

project equally at each end beyond the shortest graduation marks. The error at any point on the scale shall not exceed ± 0.03 ml and the difference between the errors at any two points shall not exceed 0.03 ml.

A-1.5 Graduated Cylinder — 100 ml.

A-2. PROCEDURE

A-2.1 Weigh 100 g of the material in the flask, add 100 ml of dry petroleum hydrocarbon solvent (boiling point 75° to 85°C) and 1 ml of dry ethyl acetate (conforming to IS : 229-1964*) or amyl acetate (conforming to IS : 231-1957†) and thoroughly mix the contents of the flask. Pour petroleum hydrocarbon solvent into the receiver up to the level of the side tube. Attach the flask to the Dean and Stark condensing the collecting system and heat the flask at such a rate that the condensate falls from the end of the condenser at a rate of two to five drops per second. Continue the distillation until condensed water is no longer visible in any part of the apparatus except at the bottom of the graduated tube and until the volume of water collected remains constant. Remove the persistent ring of condensed water in the condenser tube, if any, by increasing the rate of distillation by a few drops per second. Wash droplets of water which adhere to the lower end of the condenser tube into the receiver with petroleum hydrocarbon solvent, using the spray tube.

A-2.2 Note the number of millilitres of water in the receiver at the temperature at which the sample was measured. Assuming the density of 1.00 g/ml for the water collected in the receiver, calculate the percentage of water (by mass) in the material.

APPENDIX B

[*Table* 1, *Item* (v)]

DETERMINATION OF COLOUR BY NIGROMETER

B-0. GENERAL

B-0.1 Outline of the Method — The nigrometer is used for the measurement of blackness of black pigments like carbon blacks or lamp blacks, when these pigments are examined in the dry state of admixture with oil. It operates on the principle that blackness of the material is due to absorption and scattering of incident light thus resulting in a decrease in intensity of the reflected light. The decrease is measured on an arbitrary scale.

*Specification for ethyl acetate. (Since revised).
†Specification for amyl acetate.

B-1. APPARATUS

B-1.1 The instrument is a photometer or intensimeter operating on a 110 to 115 V circuit and is designed to provide great intensity of illumination on the black surface to be measured. It is provided with a movable light source *G*.

B-1.1.1 By varying the position of this light source, a photometric balance is obtained. This point of photometric balance is taken as the measure of the blackness of the sample under examination.

B-1.2 The instrument shown in Fig. 4 essentially consists of a cylindrical chamber *A*, where the oil rub-up of the carbon black previously prepared and spread over a 50 × 75 mm microscope slide is inserted in position so as to cover the central opening at *H*. The light from six 21-candels (cd) 12- to 16-V headlight bulbs *J* in the chamber is reflected by the sample, through the unsilvered aperture in the mirror *B*, to the eye piece *C*. On looking through the eye piece, the observer will see a small elliptical field in the centre of the larger circular field. This field is then matched against light coming from the comparison source *G*. [one 21-candels (cd) bulb connected in series with the six bulbs in chamber *A*], through two opalescent glasses *E* and *F* and reflected from the silvered surface of the mirror *B*, to the eye piece *C*. The comparison source *G* is mounted on a movable arm operated at *D*, and is adjusted until its intensity matches that reflected by the sample. The position of the arim at matching intensity is read from an arbitrary, nearly logarithmic scale, against the index pointer *K*.

NOTE — Since the instrument operates on an arbitrary scale and because it is impossible to obtain lamps whose intensities do not change during use, a standard of blackness is furnished. This is in the form of a small black tile. The instrument should be checked against this standard tile before reading any sample. The instrument is so devised that adjustment could be made to standardize its reading with that of the tile, if at any time the two readings differ.

B-2. PROCEDURE

B-2.1 Weigh accurately about 0.25 g of carbon black and transfer to a glass plate. Prepare a paste with 3 ml of stand oil (conforming to IS : 79-1950*). Transfer the plate to a mortar using a steel spatula and mull 150 strokes using a glass muller having a base diameter of 75 mm. At the end of each 50 strokes, the paste is scraped into one piece on a glass microscope slide. Without much pressure level the paste in a circular form about 38 mm in diameter and about 3 mm in thickness. It is very important that the glass slide be absolutely clear and free from filaments and finger marks as a high reading on the nigrometer will be obtained if these are present.

B-2.2 Place the prepared glass slide at *H*.

B-2.3 Take four successive readings turning the lights off while reading the scale to prevent overheating the instrument. Report the average of four readings.

*Specification for stand oil for paints (a) light (b) medium (c) heavy (d) extra heavy. (Since revised).

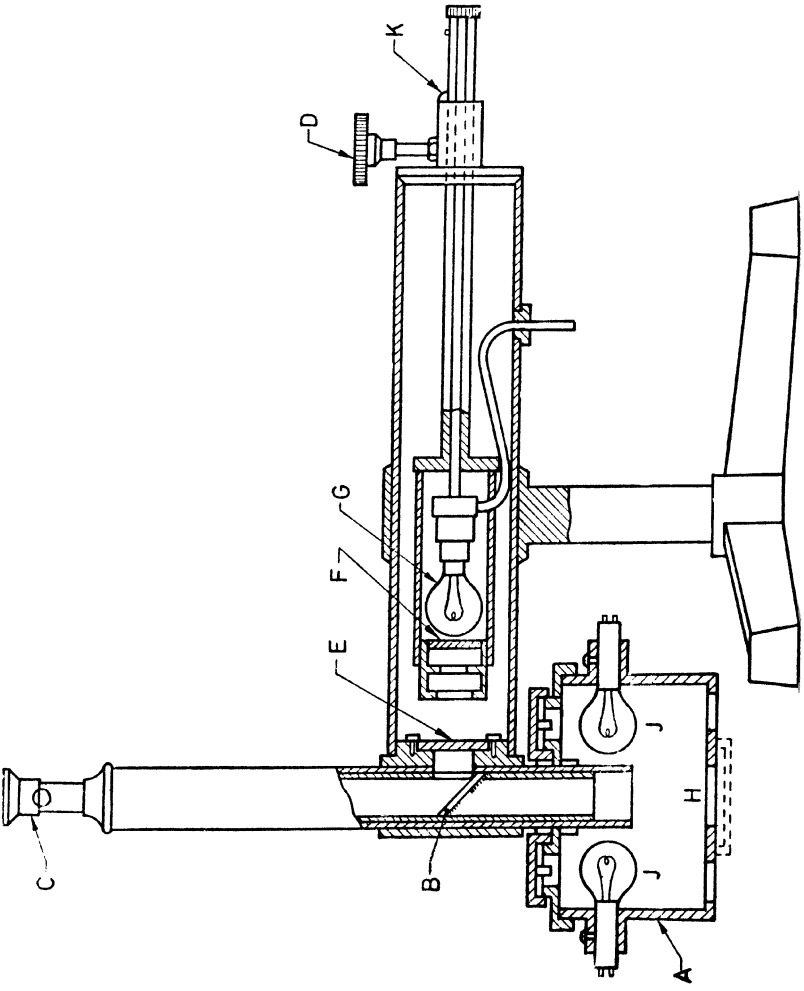

Fig. 4 NIGROMETER

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This Indian Standard has been developed by Technical Committee : CDC 50

Amendments Issued Since Publication

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Amd. No. 1	September 1987

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